6 REVIEW AND CONCLUSIONS

EXHIBIT 2

This paper provides a guide as to how South Carolina can get a smarter grid for customers, and why doing so can deliver direct economic benefits to customers as well as indirect benefits to South Carolina communities and the environment. However, like most issues in the electric industry, and like most claims that seem too good to be true, the paper makes clear that the devil is in the details. The paper also makes clear that in order to secure grid modernization benefits in excess of costs, all parties to grid modernization — utilities, regulators, stakeholders, and customers — must commit to permanent increases in time, attention, and resources. To achieve a smarter grid at a low cost or no cost, resources must be dedicated to grid planning, project selection, and post-deployment project benefit maximization and measurement, as described throughout this paper. Getting a smarter grid at the least cost will require significant, ongoing efforts from all parties involved.

6A. BEST PRACTICES FOR INTEGRATED DISTRIBUTION PLANNING ARE EMERGING

Most states' utilities, regulators, and stakeholders are fiercely independent, believe their situations to be unique, and are keen to forge their own grid modernization path. There is no doubt that laws and rules vary by state, that goals vary by state, and that each utility's situation presents individual characteristics and variation in current circumstances which must be considered in grid modernization. However, the laws of physics, the principles of economics, and the challenges electric distribution grids and businesses are likely to face in the future, are the same everywhere.

As the body of grid modernization knowledge evolves, South Carolina legislators, regulators, and stakeholders are strongly encouraged to take advantage of experiences in other states. No matter the circumstance or challenge, some other state has probably already examined it and dealt with it in some way, with varying degrees of success. Learning about other states' experiences does not obligate South Carolina regulators and stakeholders to copy their solutions, but it can help avoid mistakes and extend successes.

6B. PERFORMANCE VARIATION AND UTILITY INCENTIVES MAKE OVERSIGHT MANDATORY

A sound grid modernization plan involves more than just technologies, capabilities, and investments. A sound grid modernization plan includes strong stakeholder engagement and regulatory oversight throughout the planning, implementation, and operational stages of grid development. To maximize return on investment for customers and the environment, integrated distribution planning processes must be designed to identify the most critical capabilities; the most cost-effective ways to implement them; the most appropriate geographic extent for them; and methods to maximize available benefits for customers, from conservation to performance measurement.

To recognize the importance of good governance is to appreciate the need for long-term oversight and ongoing participation in integrated distribution planning processes by regulators and stakeholders. Grid modernization is not solely the responsibility of utilities. Regulators and stakeholders must be prepared to contribute their own resources and take on new roles and responsibilities. Many of these new roles and responsibilities are the direct result of managing the conflict between shareholder and customer interests inherent in the current cost-of-service ratemaking model. At some point, the drawbacks of cost-of-service ratemaking may exceed its attributes.

6C. IN THE LONG RUN, FUNDAMENTAL UTILITY COMPENSATION REFORM MAY BE NECESSARY

Capital bias, the throughput incentive, and cost recovery methods have driven utility investment and operating decisions for the better part of a century. Grid modernization governance requirements are driven largely by the need to manage the conflicts between shareholder and customer interests. Eliminating the conflicts eliminates some governance requirements (though not performance measurement, which is recommended in any event). As regulators and stakeholders have neither the technical expertise nor the resources required to rigorously evaluate utility's technical arguments for grid investments, a regulatory model which eliminates capital bias may be warranted. As customers become more interested in conservation and self-generation, the throughput incentive must also be addressed. As industry conditions change, utility compensation models likely need to change too.

This whitepaper presents many new issues neither the Commission nor stakeholders have previously considered. The issues are complex, the solutions are controversial, and the workload and negotiations required to address them will be formidable. Neither the Commission nor stakeholders are likely to have the technical experience required to effectively question IOU proposals and justifications for them. It may be tempting to minimize the issues, or to give up on grid modernization altogether, though either course of action short changes South Carolina businesses, consumers, and government and non-profit agencies. The potential benefits of grid modernization are large, and grid modernization is a worthy pursuit. But like all worthy pursuits, customers, communities, and stakeholders will get benefits out only if they put efforts in.

GridLab hopes readers have found this paper and its perspectives valuable. For more information or for questions, please contact Taylor McNair at GridLab: info@gridlab.org or 510-519-4208.

ENDNOTES

1. "Distributed Energy Resources", or DER, are smaller power sources that can be aggregated to provide power necessary to meet regular demand. DER can include energy storage and advanced renewable generation technologies such as photovoltaic solar panels or waste heat/biogas-fueled turbines. DER can be owned by utilities, customers, or third-parties. Many people include demand response, in which customers reduce consumption when requested to improve system utilization, in the definition of DER.
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4. Colgan et al, *"Guidance for Utilities Commissions on Time of Use Rates"*. White paper by a group of leading consumer advocates, July, 2017.
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6. King, C. and Delurey D. *Efficiency and Demand Response: Twins, Siblings, or Cousins?* Public Utilities Fortnightly. March, 2005.
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9. Massachusetts Board Of Public Utilities Case No. 15-120 through 15-122. Order dated May 10, 2018.
10. New Mexico Public Regulatory Commission Case No. 15-00312-UT. Order dated April 11, 2018.
11. North Carolina Utilities Commission Order in Docket No. E-7 Sub 1146, p. 19.
12. Virginia State Corporations Commission Case No. PUR-2018-00100. Order dated Jan. 17, 2019, p. 15
13. California Public Utilities Commission A.15-09-001 (Pacific Gas & Electric Rate Case). Prepared testimony of Paul Alvarez and Dennis Stephens. April 29, 2016. Also A.16-09-001 (Southern California Edison Rate Case.) Prepared testimony of Paul Alvarez and Dennis Stephens. May 2, 2017.
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16. Alvarez, P. *Smart Grid Hype & Reality: A Systems Approach to Maximizing Customer Return on Utility Investment, 2nd Edition*. Wired Group Press, 2018. Table 18, page 159 (smart meters); Table 22, page 165 (distribution automation).
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18. Hledik R, Faruqui A, and Warner, C. *The National Landscape of Residential TOU Rates: A Preliminary Summary.* Slide 2. Accessed via Internet at http://www.brattle.com/news-and-knowledge/publications/archive/2017 on January 2, 2019.
19. North Carolina Utilities Commission E-2, Sub 1174. Duke Energy response to NCSEA DR 03-10.
20. Oklahoma Corporations Commission Cause No. PUD 2010-00029. Order 576595, p. 18.
21. Ohio Public Utilities Commission Case No. 10-2326-GE-RDR. Approved Stipulation and Recommendation dated February 24, 2012, p. 5.
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29. The Interruption Cost Estimate Calculator is available at https://icecalculator.com/home.

EXHIBIT 2

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